Please add the following new claims:

26. (new) An apparatus for measuring three-dimensional structures formed on a surface of a specimen, comprising:

a beam-formation system for forming a beam of incident monochromatic electromagnetic energy and for directing said beam of incident monochromatic electromagnetic energy at a predetermined illumination angle toward a preselected region on the surface of the specimen;

an energy-collection system for receiving at least a portion of said beam of incident monochromatic electromagnetic energy scattered from a three-dimensional structure formed on the surface within the preselected region and for converting said received portion of said beam of incident monochromatic electromagnetic energy into a data signal;

a rotation system for rotating said beam-formation system and said energy-collection system successively through a plurality of rotation angles about a rotation axis perpendicular to the surface of the specimen and centrally intersecting the preselected region; and

a processing system for processing said data signal provided by said energy-collection system at each of said plurality of rotation angles to provide a measurement of a dimension of the three-dimensional structure.

27. (new) The apparatus of claim 26, wherein said beam-formation system and said energy-collection system are disposed in a bright field detection configuration.

28. (new) The apparatus of claim 26, wherein said beam-formation system and said energy-collection system are disposed in a dark field detection configuration.

29. (new) The apparatus of claim 26, further comprising a monochromatic electromagnetic energy source for providing output energy to said beam-formation system, said beam-formation system converting said output energy into said beam of incident monochromatic electromagnetic energy.

30. (new) The apparatus of claim 27, wherein said rotation system rotates said monochromatic electromagnetic energy source with said beam-formation system.

31. (new) The apparatus of claim 27, wherein said monochromatic electromagnetic energy source is stationary.

32. (new) The apparatus of claim 27, wherein said monochromatic electromagnetic energy source comprises a laser.

33. (new) The apparatus of claim 27, wherein said beam-formation system divides said output energy into first and second energy components, polarizes said first energy component to form a P-polarized first energy component, modulates said first polarized energy components at a first modulation frequency, polarizes said second energy component to form a S-polarized second energy component, modulates said second polarized energy component at a second modulation frequency, and combines said first and second modulated, polarized energy components to form said beam of incident monochromatic electromagnetic energy.

34. (new) The apparatus of claim 26, wherein said beam-formation system directs said beam of incident electromagnetic energy toward the preselected region with a wavelength within a predetermined range between four hundred nanometers and one hundred, fifty nanometers.

35. (new) The apparatus of claim 34, wherein said wavelength is equal to one hundred, ninety-three nanometers.

36. (new) The apparatus of claim 26, wherein said data signal is proportional to a phase of said received portion.

37. (new) The apparatus of claim 26, wherein said data signal is proportional to an intensity of said received portion.

38. (new) An apparatus for measuring three-dimensional structures formed on a surface of a specimen, comprising:

a monochromatic electromagnetic energy source for providing output energy;

a beam-formation system for converting said output energy into a beam of incident monochromatic electromagnetic energy and for directing said beam of incident monochromatic electromagnetic energy at each of a plurality of illumination angles toward a preselected region of the surface of the specimen;

an energy-collection system for receiving at least a portion of said beam of incident monochromatic electromagnetic energy scattered from a three-dimensional structure formed on the surface within the preselected region as received energy;

an energy detector for receiving reflected energy from said energy-collection system and for converting said reflected energy into data signals;

a rotation system for rotating said beam-formation system and said energy-collection system successively through a plurality of rotation angles about a rotation axis perpendicular to the surface of the specimen and centrally intersecting the preselected region; and

a processing system for processing said data signals at each of said plurality of rotation angles and at each of said plurality of illumination angles to provide a measurement of a dimension of the three-dimensional structure.

39. (new) The apparatus of claim 38, wherein said beam-formation system and said energy-collection system are disposed in a bright field detection configuration.

40. (new) The apparatus of claim 38, wherein said beam-formation system and said energy-collection system are disposed in a dark field detection configuration.

41. (new) The apparatus of claim 38, wherein said rotation system rotates said monochromatic electromagnetic energy source with said beam-formation system.

42. (new) The apparatus of claim 38, wherein said monochromatic electromagnetic energy source is stationary.

43. (new) The apparatus of claim 38, wherein said monochromatic electromagnetic energy source comprises a laser.

44. (new) The apparatus of claim 38, wherein said beam-formation system divides said output energy into first and second energy components, polarizes said first energy component to form a P-polarized first energy component, polarizes said second energy component to form a S-polarized second energy component, modulates said first and second polarized energy components at first and second modulation frequencies, and combines said first and second modulated, polarized energy components to form said beam of incident monochromatic electromagnetic energy.

45. (new) The apparatus of claim 38, wherein said data signals are proportional to a phase of said received portion.

46. (new) The apparatus of claim 38, wherein said data signals are proportional to an intensity of said received portion.

47. (new) An apparatus for measuring three-dimensional structures formed on a surface of a specimen, comprising:

means for forming a beam of incident polychromatic electromagnetic energy having a plurality of wavelengths;

means for directing said beam of incident electromagnetic energy at a predetermined illumination angle toward a preselected region on the surface of the specimen;

means for receiving at least a portion of said beam of incident electromagnetic energy scattered from a three-dimensional structure formed on the surface within the preselected region;

means for converting said received portion of said beam of incident electromagnetic energy into a data signal for each of said plurality of wavelengths;

means for rotating said directing means and said receiving means successively through a plurality of rotation angles about a rotation axis perpendicular to the surface of the specimen and centrally intersecting the preselected region; and

means for processing said data signal for each of said plurality of wavelengths at each of said plurality of rotation angles to provide a measurement of a dimension of the three-dimensional structure.

48. (new) The apparatus of claim 47, wherein said directing means and said receiving means are disposed in a bright field detection configuration.

49. (new) The apparatus of claim 47, wherein said directing means and said receiving means are disposed in a dark field detection configuration.

50. (new) The apparatus of claim 47, further comprising a means for providing polychromatic electromagnetic energy to said forming means, said forming means converting said polychromatic electromagnetic energy into said beam of incident polychromatic electromagnetic energy.

51. (new) The apparatus of claim 47, wherein said rotating means rotates said providing means with said forming means.

52. (new) The apparatus of claim 47, wherein said providing means is stationary.

53. (new) The apparatus of claim 47, wherein said data signal is proportional to a phase of said received portion.

54. (new) The apparatus of claim 47, wherein said data signal is proportional to an intensity of said received portion.

55. (new) An apparatus for measuring three-dimensional structures formed on a surface of a specimen, comprising:

a beam-formation system for forming a beam of incident electromagnetic energy and for directing said beam of incident electromagnetic energy toward a preselected region of the surface of the specimen;

a first energy-collection system for receiving at least a portion of said beam of incident electromagnetic energy scattered from a three-dimensional structure formed on the surface within the preselected region and for converting said received portion of said beam of incident electromagnetic energy into a first data signal;

a rotation system for rotating said beam-formation system and said first energy-collection system successively through a plurality of rotation angles about a rotation axis perpendicular to the surface of the specimen and centrally intersecting the preselected region; and

a processing system for processing said first data signal provided by said first energy-collection system at each of said plurality of rotation angles to provide a measurement of a dimension of the three-dimensional structure.

56. (new) The apparatus of claim 55, wherein said beam-formation system and said first energy-collection system are disposed in a bright field detection configuration.

57. (new) The apparatus of claim 55, wherein said beam-formation system and said first energy-collection system are disposed in a dark field detection configuration.

58. (new) The apparatus of claim 55, further comprising an electromagnetic energy source for providing output energy to said beam-formation system, said beam-formation system converting said output energy into said beam of incident monochromatic electromagnetic energy.

59. (new) The apparatus of claim 58, wherein said rotation system rotates said electromagnetic energy source with said beam-formation system.

60. (new) The apparatus of claim 58, wherein said electromagnetic energy source is stationary.

61. (new) The apparatus of claim 58, wherein said electromagnetic energy source comprises a monochromatic light source.

62. (new) The apparatus of claim 58, wherein said beam-formation system divides said output energy into first and second energy components, polarizes said first and second energy components to form P-polarized and S-polarized energy components, modulates said first and second energy components at first and second modulation frequencies, and combines said first and second modulated, polarized energy components to form said beam of incident electromagnetic energy.

63. (new) The apparatus of claim 55, wherein said first data signal is proportional to a phase of said received portion.

64. (new) The apparatus of claim 55, wherein said first data signal is proportional to an intensity of said received portion.

65. (new) The apparatus of claim 55, further comprising a second energy-collection system for receiving at least a second portion of said beam of incident electromagnetic energy scattered from the three-dimensional structure and for converting said second received portion of said beam of incident electromagnetic energy into a second data signal, said second energy-collection system being rotated by said rotation system through said plurality of rotation angles about said rotation axis and being disposed in a dark field detection configuration with said beam-formation system, said processing system processing said first and second data signal at each of said plurality of rotation angles to provide the measurement of the dimension of the three-dimensional structure.

66. (new) A system for measuring three-dimensional structures, comprising:

a specimen having a surface that forms a plurality of three-dimensional structures;

a polychromatic electromagnetic energy source for providing output energy;

a beam-formation system for converting said output energy into a beam of incident polychromatic electromagnetic energy having a plurality of wavelengths and for directing said beam of incident electromagnetic energy at each of a plurality of illumination angles toward a preselected region of said surface of said specimen;

an energy-collection system for receiving at least a portion of said beam of incident electromagnetic energy scattered from a three-dimensional structure formed on said surface within said preselected region and for converting said received portion of said beam of incident electromagnetic energy into data signals for each of said plurality of wavelengths;

a rotation system for rotating said beam-formation system and said energy-collection system successively through a plurality of rotation angles about a rotation axis perpendicular to said surface of said specimen and centrally intersecting said preselected region; and

a processing system for processing said data signals for each of said plurality of wavelengths at each of said plurality of rotation angles to provide a measurement of a dimension of said three-dimensional structure.

67. (new) The system of claim 66, wherein said beam-formation system and said energy-collection system are disposed in a bright field detection configuration.

68. (new) The system of claim 66, wherein said beam-formation system and said energy-collection system are disposed in a dark field detection configuration.

69. (new) The system of claim 66, wherein said rotation system rotates said polychromatic electromagnetic energy source with said beam-formation system.

70. (new) The system of claim 66, wherein said polychromatic electromagnetic energy source is stationary.

71. (new) The system of claim 66, wherein said data signals are proportional to a phase of said received portion.

72. (new) The system of claim 66, wherein said data signals are proportional to an intensity of said received portion.

73. (new) The system of claim 66, wherein said measurement comprises a measurement of a sidewall angle of the three-dimensional structure.

74. (new) The system of claim 66, wherein said measurement comprises a measurement of a height of the three-dimensional structure.

75. (new) The system of claim 66, wherein said specimen comprises a semiconductor wafer.

76. (new) The system of claim 75, wherein said three-dimensional structure is formed from a metallic material.

77. (new) The system of claim 75, wherein said three-dimensional structure is formed from a dielectric material.

78. (new) The system of claim 75, wherein said three-dimensional structure is formed from metallic and dielectric materials.

79. (new) The system of claim 75, wherein said three-dimensional structure comprises an interconnect formed on said semiconductor wafer.

80. (new) The system of claim 75, wherein said three-dimensional structure comprises a Copper Damascene structure formed on said semiconductor wafer.

81. (new) The system of claim 66, wherein said processing system further processes said data signals to provide a determination of whether the specimen includes a defect.

82. (new) The system of claim 81, wherein said defect includes an incorrect film thickness.

83. (new) A method for measuring three-dimensional structures, comprising:

providing a specimen;

selecting a region on a surface of said specimen;

forming a beam of incident electromagnetic energy;

directing said beam of incident electromagnetic energy at an illumination angle toward said selected region;

rotating said beam of incident electromagnetic energy successively through a plurality of rotation angles about a rotation axis perpendicular to said surface of said specimen and centrally intersecting said selected region;

receiving at least a portion of said beam of incident electromagnetic energy scattered from a three-dimensional structure formed on said surface within said selected region at each of said plurality of rotation angles;

converting said received portion of said beam of incident electromagnetic energy at each of said plurality of rotation angles into data signals; and

processing said data signals to provide a measurement of a dimension of said three-dimensional structure.

84. (new) The method of claim 83, wherein said forming said beam of incident electromagnetic energy comprises forming a beam of incident monochromatic electromagnetic energy.

85. (new) The method of claim 83, wherein said forming said beam of incident electromagnetic energy comprises forming a beam of incident polychromatic electromagnetic energy.

86. (new) The method of claim 83, wherein said forming said beam of incident electromagnetic energy includes converting incoming electromagnetic energy into said beam of incident electromagnetic energy.

87. (new) The method of claim 86, wherein said converting said incoming electromagnetic energy comprises converting incoming monochromatic electromagnetic energy into said beam of incident electromagnetic energy.

88. (new) The method of claim 86, wherein said converting said incoming electromagnetic energy comprises converting incoming polychromatic electromagnetic energy into said beam of incident electromagnetic energy.

89. (new) The method of claim 86, wherein said converting said incoming electromagnetic energy comprises converting said incoming electromagnetic energy from a stationary source into said beam of incident electromagnetic energy.

90. (new) The method of claim 86, wherein said forming said beam of incident electromagnetic energy includes dividing said incoming electromagnetic energy into first and second energy components, polarizing said first and second energy components to form P-polarized and S-polarized energy components, modulating said first and second energy components at first and second modulation frequencies, and combining said first and second modulated, polarized energy components to form said beam of incident electromagnetic energy.

91. (new) The method of claim 83, wherein said receiving said received portion of said beam of incident electromagnetic energy includes receiving a specular reflection of said beam of incident electromagnetic energy reflected from said three-dimensional structure.

92. (new) The method of claim 83, wherein said receiving said received portion of said beam of incident electromagnetic energy includes receiving a non-specular scattering of said beam of incident electromagnetic energy scattered from said three-dimensional structure.

93. (new) The method of claim 83, wherein said converting said received portion comprises converting said received portion into data signals that are proportional to a phase of said received portion.

94. (new) The method of claim 83, wherein said converting said received portion comprises converting said received portion into data signals that are proportional to an intensity of said received portion.

95. (new) The method of claim 83, further comprising determining whether said specimen includes a defect.

96. (new) An apparatus for measuring three-dimensional structures formed on a surface of a specimen, comprising:

a plurality of beam-formation systems being disposed in a first plane parallel to the surface of the specimen and at a first plurality of preselected angles about a central preselected region of the surface, each of said plurality of beam-formation systems forming a beam of incident electromagnetic energy and successively directing said beam of incident electromagnetic energy at a predetermined illumination angle toward said preselected region of the surface of the specimen;

a plurality of energy-collection systems for receiving at least a portion of said successive beams of incident electromagnetic energy scattered from a three-dimensional structure formed on the surface within the preselected region and for converting said received portion of said successive beams of incident electromagnetic energy into data signals, said plurality of energy-collection systems being disposed in a second plane parallel to the surface and at a second plurality of preselected angles about the central preselected region; and

a processing system for processing said data signals at each of said second plurality of preselected angles to provide a measurement of a dimension of the three-dimensional structure.

97. (new) The apparatus of claim 96, wherein at least one of said plurality of beam-formation systems comprises a beam-formation system for providing a beam of incident monochromatic electromagnetic energy.

98. (new) The apparatus of claim 96, wherein at least one of said plurality of beam-formation systems comprises a beam-formation system for providing a beam of incident polychromatic electromagnetic energy.

99. (new) The apparatus of claim 96, wherein said plurality of beam-formation systems and said plurality of energy-collection systems are disposed in the same plane, and wherein said first plurality of preselected angles and said second plurality of preselected angles are equal.

100. (new) The apparatus of claim 96, further comprising at least one electromagnetic energy source for providing output energy to said plurality of beam-formation systems, each of said plurality of beam-formation systems converting said output energy into said beam of incident electromagnetic energy.

101. (new) The apparatus of claim 100, wherein each of said plurality of beam-formation systems receives said output energy from a different one of said at least one electromagnetic energy source.

102. (new) The apparatus of claim 100, wherein at least one of said at least one electromagnetic energy source comprises a polychromatic energy source.

103. (new) The apparatus of claim 96, wherein at least one selected energy-collection system receives said received portion of said beam of incident electromagnetic energy from a selected one of said plurality of beam-formation systems.

104. (new) The apparatus of claim 103, wherein at least one of said at least one selected energy-collection system and said selected beam-formation system are disposed in a bright field detection configuration.

105. (new) The apparatus of claim 103, wherein at least one of said at least one selected energy-collection system and said selected beam-formation system are disposed in a dark field detection configuration.

106. (new) The apparatus of claim 96, wherein said data signals are proportional to a phase of said received portion.

107. (new) The apparatus of claim 96, wherein said data signals are proportional to an intensity of said received portion.